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ORIGINAL ARTICLE

Martina Hug · Martin Tönz · Georges Kaiser

Parental stress in paediatric day-case surgery

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Abstract Day-case surgery involves a considerable amount of stress not only for the children who undergo surgery but also for their parents. In a prospective survey analysis performed in 1995/1996, we identified the following main factors influencing the amount of stress experienced by parents: feelings of insufficient preparation and problems with postoperative pain at home. As a consequence, measures were taken regarding information and pain management, including the creation of an interactive CD-ROM. We then analysed the consequences of our interventions regarding parental stress. In this study we collected the data of all patients who underwent day-case surgery during two additional 13-month periods in 1997/1998 and 1999/2000. The methods of data collection remained unchanged for all three periods and included a questionnaire for the parents. In total, 1,490 questionnaires were analysed. Comparing the three time periods, parents' feelings of being well-informed improved significantly (91% vs. 98% vs. 97%, $P < 0.0001$). However, the percentage of those experiencing moderate to severe stress did not change substantially (16% vs. 9% vs. 19%, not significant). Analgaesics were given more frequently over the years in a general as well as a prophylactic manner (20% vs. 35% vs. 43%, $P < 0.0001$). Nevertheless, problems with pain control at home remained unchanged (33% vs. 23% vs. 29%, not significant). Despite considerable efforts to improve information, parental stress did not significantly decrease. It cannot be assessed yet whether wrong information was given or whether a certain degree of stress cannot be prevented. There is some evidence that improvements in coping with pain-related problems might be a promising next step.

Keywords Day surgery · Parental stress · Child

M. Hug (✉)
University Children's Hospital,
8032 Zurich, Switzerland
E-mail: Martina.Hug@kispi.unizh.ch
Tel.: +41-1-2667111
Fax: +41-1-2667171

M. Hug · M. Tönz · G. Kaiser
Department of Paediatric Surgery,
University Children's Hospital, Bern, Switzerland

Introduction

Paediatric surgery done in the outpatient setting has increased considerably and continues to do so. Day-case surgery offers several well-known advantages over inpatient procedures. Besides the economic benefits [1, 2], others include reduced emotional stress experienced by the child due to the short hospital stay and minimal family disruption [2, 3]. On the other hand, the burden on the parents is obviously increased in that preoperative preparation and postoperative treatment become their responsibilities. Because children depend on their parents for support and guidance in dealing with new or stressful situations, parents play a critical role in the setting of day surgery [4, 5].

We therefore analysed, as a first step, parental perceptions of ambulatory surgery and the factors associated with parental stress and discomfort. The results showed an association of the following factors on parental stress: feelings of insufficient preparation; insecurity in providing nursing care at home; problems at home such as fever, vomiting, sleep disorders, and others; problems with postoperative pain at home; the parents' being foreign-language speakers; and no previous experience with surgery [6]. Consequently, we decided to concentrate on two topics for improving the situation: information given to the parents and pain management. To provide better information to parents and their children, we created an interactive CD-ROM. For better pain management, we instructed parents about pain medication and its prophylactic administration. The aim of this study was to analyse the impact of these interventions on parental stress.

Patients and methods

Patients

All patients undergoing elective day-case surgery in our tertiary care centre for paediatric surgery during three selected time periods were enrolled in this prospective study. The first period consisted of 18 months between January 1995 and July 1996, the second consisted of 13 months between November 1997 and December 1998, and the third period was 13 months between November 1999 and December 2000.

Patients were either seen and informed in our outpatient department before their operations or were sent directly for surgery by their family doctors or paediatricians. Each patient scheduled for surgery received clear written instructions before admission explaining the standard routine of the day. The children were nursed throughout their stay by the paediatric nursing staff and also by their parents, who remained with their children. Since 1999, all patients have received a booklet together with an interactive CD-ROM with extensive information.

All children were admitted at 7:30 a.m. and were examined by the surgeon and the anaesthesiologist. According to the patient's age and the planned procedures, the operation list was prepared. The children were operated on by a consultant surgeon. While waiting, the children had the opportunity to play in the nearby kindergarten. All operations were performed in the morning, and the children were discharged in the afternoon after they had again been seen by the surgeon and the anaesthesiologist. If advisable or desired, they were kept overnight in the hospital. Parents were informed by nursing staff and the surgeon about basic nursing care at home and the postoperative course of recovery. The day after surgery, the families were contacted by the day-care nurse to assess the children's postoperative status and to offer further assistance if necessary.

Methods

The methods of data collection remained unchanged for all three time periods and have been published in detail [6]. Data were collected from demographic and perioperative information obtained by the physicians. In addition, a questionnaire was given to all patients' parents prior to discharge, and they were requested to return it within the first postoperative week. Completion and return of the survey was voluntary and thus implied consent to participate in the study. On the day of admission, all parents were asked by the responsible physician, who was seeing the patients for the first time, whether they felt adequately prepared for day surgery. Parents/patients whose mother tongue was not German and were unable to communicate in more or less fluent German were considered as speaking a foreign language.

The questionnaire included structured questions addressing preoperative, perioperative, and discharge preparation; problems with fasting; preoperative waiting time; their feelings in the day surgery environment; the quality of nursing in the clinic; nursing care in the home environment; postoperative problems at home such as fever, vomiting, sleep disorders, eating disorders, and others; pain at home; management of pain at home; and the willingness to do the same procedure again as a day case. For the third period (1999/2000), the questionnaire included questions concerning the CD-ROM. As a major outcome variable, families were asked to rate on a three-point scale how stressful the day-case surgery experience had been for them: no stress/mild stress, moderate stress, or severe stress. The questionnaire was based on data published by Voepel-Lewis et al. [7].

The interactive CD-ROM was designed for children and parents in order to prepare them for the event of surgery. It was distributed prior to admission to all families with children scheduled for day surgery. The CD gave information about situations and procedures, including problems the children and their families might face before admission, on the day of surgery, and the day after. The combination of an informational brochure with the animation on the CD-ROM was particularly designed for children and parents who might have been indifferent to the problems of day surgery and for parents with major language difficulties. The CD-ROM was enclosed in a booklet containing the same information as on the CD-ROM for those parents unable to play the CD.

Statistics

The data for all three periods were analysed identically, and the results were compared. Values are reported as mean ± standard deviation. For proportions, 95% confidence intervals (CI) are given in parentheses. The measure of association between variables is reported as odds ratio (OR) with 95% CI. For this purpose, the groups reporting moderate and severe stress were collapsed to one group. Chi-square analysis and Fisher's exact test were employed for categorical data. In addition, logistic regressions were performed to test for different associations between several variables and the main variable, stress. Differences were considered significant at a probability level of $P < 0.05$.

Results

Survey

The data for 1,490 paediatric patients who were operated on in an ambulatory setting during three periods of time were analysed and compared. Perioperative and demographic data for all three periods are listed in Table 1. The return rate decreased slightly during the

Table 1 Perioperative and demographic data

	1995/1996	1997/1998	1999/2000
Patients	568	394	528
Questionnaires returned	368 (65%)	194 (49%)	277 (53%)
Male patients	378 (67%)	288 (73%)	370 (71%)
Age	6.3 ± 4.3 years	6.8 ± 4.4 years	6.8 ± 4.7 years
Preoperative waiting time	1.8 ± 1.1 h	1.7 ± 1.0 h	2.0 ± 1.2 h
Postoperative complications	50 (9%)	48 (13%)	51 (11%)
Overnight stay	17 (3%)	2 (0.5%)	3 (0.6%)
Foreign-language-speaking parent	97 (17%)	47 (13%)	61 (13%)

observed period. The percentage of foreign-language-speaking parents remained nearly unchanged, as did the type of performed operations (circumcisions, metal removal, hernia/hydrocoele repair, soft tissue excisions, anorectal procedures, cystoscopy, orchidopexy, etc.). There was no significant difference in these data between the three periods.

Information

Comparing the results of all three periods, significantly fewer parents in the later time periods felt insufficiently prepared by the day of the surgery. Whereas in 1995/1996 9% felt inadequately prepared, only 2% and 3% did in the second and third periods, respectively ($P < 0.0001$). Detailed analysis of the type of insufficient information showed no difference during the three time periods (Table 2).

During the first period, parents who were seen at the outpatient clinic felt significantly better prepared on the day of surgery than did parents who were sent by their family doctor or paediatrician (94% vs. 87%, $P < 0.01$). During the subsequent two periods, however, there was no difference (1997/1998: 98% vs. 98% and 1999/2000: 97% vs. 97%).

In the first period, parents speaking a foreign language felt significantly less informed than German-speaking parents did (21% vs. 6%, $P < 0.0001$, OR = 0.24, 0.13–0.46). Similar results were found in the third period (56% vs. 23%, $P < 0.0001$, OR = 0.24, 0.12–0.44). During the first period parents who felt insufficiently prepared for surgery at the time of admission completed and returned the questionnaire significantly less frequently than the parents who felt prepared (48% vs. 67%, $P = 0.01$, OR = 0.30, 0.19–0.47), which was not the case in the subsequent periods (1997/1998: 49% vs. 53% and 1999/2000: 53% vs. 54%).

Insecurity about providing postoperative nursing care at home did not differ significantly over the three periods: 5% (17) of the answering parents during the first period, 2% (four) during the second, and 3% (eight) during the third period felt insecure. The telephone call made by the nurse the day after surgery was considered by 300 (84%) of the parents to be helpful during the first period, by 154 (92%) during the second period, and by 206 (86%) during the third period.

Information and CD-ROM

For the third period, the questionnaire included questions about the CD-ROM.

In 1999/2000 all patients scheduled for surgery received a CD-ROM prior to admission. Seventy-two percent (111/155) of the answering parents considered the CD to be helpful, while 27% (50/187) were unable to play it. There was no significant association between the CD-ROM and feelings of sufficient preparation ($P = 0.64$).

Pain

Problems dealing with postoperative pain and its management at home were always considered to be of major concern. Pain after discharge was a problem for 30% (110/367) during the first period, 24% (43/183) during the second period, and 29% (75/255) during the third period. Nineteen (5%) of the children had more pain than their parents had expected during the first period, seven (4%) during the second, and 19 (7%) during the third period.

Over the course of time, parents administered analgaesics significantly more frequently in a general as well as a prophylactic manner ($P < 0.0001$ and $P < 0.0001$,

Table 2 Assessment of the information given to parents

	1995/1996	1997/1998	1999/2000
Information insufficient[a]	9% (46/538[b])	2% (6/375)	3% (13/403)
Sufficient information about preoperative preparation	94% (345/367)	97% (186/192)	99% (268/270)
Sufficient information about the day of surgery	92% (334/363)	95% (181/191)	96% (258/269)
Sufficient information about postoperative care	90% (324/360)	93% (173/186)	87% (232/267)

[a] $P < 0.0001$
[b] Second number indicates the number of responses to question

Table 3 Administration of analgaesics at home

	1995/1996	1997/1998	1999/2000
Administration of analgaesics[a]	166/369[b] (45%)	112/193 (58%)	190/264 (72%)
Analgaesics given 1 day	124/365 (34%)	78/190 (41%)	132/259 (51%)
Analgaesics given more than 1 day	42/350 (12%)	33/194 (17%)	56/255 (22%)
Prophylactic administration[a]	73/366 (20%)	63/182 (35%)	107/249 (43%)

[a] $P < 0.0001$
[b] Second number indicates the number of responses to question

respectively; see Table 3). The proportion of parents who gave their children no analgaesic drug despite the children's having pain decreased from 16% (12/110) in 1995/1996 to 5% (2/43) in 1997/1998 and 8% (6/75) in 1999/2000 ($P < 0.0001$).

Other postoperative problems at home

The percentage of postoperative problems at home other than pain remained fairly constant during all three time periods: fever (5% vs. 3% vs. 5%), infections (2% vs. 3% vs. 2%), sleep disorders (6% vs. 6% vs. 6%), eating disorders (4% vs. 2% vs. 4%), and vomiting (5% vs. 6% vs. 7%).

Stress

Sixteen percent (59/363) of the respondents in the first period, 9% (18/190) in the second period, and 19% (49/264) in the third period experienced moderate to severe stress associated with day surgery.

Factors associated with the amount of parental stress are shown in Table 4. The following factors were significantly associated with stress in more than one period of time: insecurity providing nursing care at home (1995/1996 $P < 0.01$; 1999/2000 $P < 0.043$), problems with pain after discharge (1995/1996 $P < 0.0007$; 1999/2000 $P < 0.014$), and the need to administer analgaesics for several days (1997/1998 $P < 0.018$; 1999/2000 $P < 0.01$).

The answer to the question of whether parents would repeat their child's operation on an ambulatory basis remained constant for all three periods: 98% (355) vs. 98% (188) vs. 99% (263) would agree to enter the day-case unit again.

Analysis of the data of all years

Finally, a logistic regression model was constructed including data for all the years (1995–2000) that referred to the main variable, stress. Differences were worked out by introducing factor variables. In all, considerably more variables turned out to be significant than in the separately analysed time periods. Significant variables for stress were insufficient information (OR 4.34, CI 1.81–10.4), parents' being foreign-language speakers (OR 2.63, CI 1.27–5.42), feelings of discomfort in the hospital (OR 2.17, CI 1.09–4.34), perception of the hospital atmosphere as unfriendly (OR 2.80, CI 1.15–6.81), and more pain at home than expected (OR 3.07, CI 1.35–6.97).

In addition, two time-related variables were identified as significant: the duration of the anaesthesia and the postoperative waiting time. The OR was calculated for the difference of 1 h for the duration of anaesthesia. Prolonging anaesthesia by 1 h increased the chance of the parents' feeling stressed by a factor of 3.82 (CI 1.16–12.6). Regarding the postoperative waiting time, the OR was calculated for waiting times between 3 and 6 h and more than 6 h. The chance of feeling stressed was 2.19-fold greater if the waiting time was more than 6 h than for a duration of 3–6 h (CI 1.21–3.98).

Discussion

In our previously published study [6], we tried to identify the factors associated with parental stress and discomfort. In the setting of day surgery, parental stress is a subjective perception of burden, worry, and trouble connected with the event.

On the basis of the data collected and analysed in 1995/1996, we continued with the study over the

Table 4 Significant factors associated with the amount of parental stress (analysis of the three time periods)

Factors associated with parental stress	1995/1996	1997/1998	1999/2000
Insufficient information	OR = 3.34		
Insecurity giving nursing care at home	OR = 3.36		OR = 4.62
Problems at home	OR = 3.15		
Problems with pain	OR = 2.43		OR = 2.33
Foreign-language speaker	OR = 2.28		
Duration of anaesthesia		$P = 0.0002$	
Total time in hospital		$P = 0.0057$	
Administration of analgaesics for several days		OR = 3.64	OR = 2.55
More pain than expected			OR = 5.81
Male gender			OR = 2.58
Emergency call to a physician			OR = 5.75

following years and now present the results of the data including the years of 1997/1998 and 1999/2000.

Lack of information and the consequent feeling of insufficient preparation were identified in 1995/1996 [6, 7] as main factors influencing parental stress . In light of these results, we took measures to improve the information given to parents, with the aim of reducing their stress. Although the intervention was successful in the sense that more parents felt well informed in the years 1997–2000 compared with 1995/1996, the degree of experienced stress did not change substantially over the course of time. This finding may lead to some questions: Are we conveying the wrong information, or is stress just not preventable?

The goal is to equip the child and his or parents with information they can use to deal with otherwise unknown circumstances [8]. But many different aspects and challenges are included in what seems to be a simple aim. The extent of the information given is considerable. It includes practical information about preparation for the day, the day's routine, the postoperative care, possible risks and complications, and so on. Because most of the families had never been in this situation before, they were confronted with many eventualities and probabilities. Furthermore, it must be remembered that what may be routine to health care providers is often frightening for parents [8]. What if detailed information—including risks, possible complications, and possible difficulties referring to anaesthesia, surgical intervention, and postoperative nursing care—actually enhances parental anxiety and consequently increase stress? Kain et al. [9], in identifying the perioperative anaesthetic information that parents wanted, suggested in their study that providing detailed anaesthetic risk information was not associated with increased parental anxiety. The vast majority of parents wished to have thorough and comprehensive information addressing all possible complications.

Specific methods of preparation have long been demanded [7]. Kain et al. [10] reported on the effectiveness of an already experienced method, behavioural preparation programs. They revealed that this intervention is best undertaken with knowledge of the child's age and his or her past medical experiences, thus emphasizing the importance of individually addressing children's and families' needs and concerns. This requires recognizing individual demands based on various information such as demographic data and intellectual and psychological aspects of the parents and children. The design of an interactive CD-ROM that presents in a playful way the story of a child undergoing surgery seemed to us a promising tool of modern communication and up-to-date in terms of psychological preparation. Although a majority of the answering parents considered it helpful, a great number were not able to use it; 27% were unable to play it. If the use of computers increases, the benefits of the CD-ROM will have to be analysed in the future. Furthermore, it must be considered whether our interactive CD-ROM's design concentrated too much on preparing the children rather than on preparing their parents.

Apart from feelings of insufficient preparation, problems with pain at home were significantly associated with parental stress. According to recent studies, the postoperative pain management of children at home remains an issue of interest to many health care providers [4–6, 11–14]. Several studies have demonstrated that postoperative pain management at home is far from being perfect. Parents' underestimation of their children's pain is a known phenomenon, with the consequence of inadequate delivery of analgaesia [11]. The importance of adequate treatment of postoperative pain lies not only in preventing parental stress but also in preventing the child's stress. Our pre-intervention study also showed that only 45% of the children received analgaesics at home (16% of the children received no painkillers even though they expressed pain) and that prophylactic administration was given to only 20% of the patients. After our interventions, the situation improved significantly, with a total of 72% of patients receiving analgaesic drugs and 43% of children receiving prophylaxis. But again, even though the situation with regard to pain medication improved considerably, the percentage of parents expressing problems with pain at home remained stable over the three time periods, and pain problems continued to be a significant stress factor for parents. It might well be that the child profited from the more extensive administration of analgaesics, but our questionnaire did not include questions to the children, and therefore we do not have the corresponding data. The reason for failing to prevent stress related to postoperative pain might be twofold. First, parents still may not receive enough information. Second, as parents' knowledge improved considerably over the years with regard to preparing for surgery and for the day itself, the situation did not change concerning the information about postoperative care; 13% of parents still felt insufficiently prepared for postoperative problems.

Our study reflects that families in general are very satisfied with day-case surgery and that a vast majority would undergo the same procedure again. But despite considerable efforts, the amount of parental stress did not significantly decrease. Families' perception of day surgery must be the subject of further studies in order to improve health quality.

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